REMARKS

Claims 1, 3-11, 13-18, and 21, 24, 27, and 28 are pending. Claims 1, 9, and 16 have been amended. Claims 22, 23, 25, and 26 have been cancelled. No new matter has been introduced. Reexamination and reconsideration of this application are respectfully requested.

In the October 7, 2003 Office Action, the Examiner rejected claims 1, 3-11, 13-18, and 21, 24, 27, and 28 under 35 U.S.C. §103(a) as being anticipated by U.S. Patent No. 6,363,160 to Bradski et al. ("Bradski"), in view of a combination of U.S. Patent No. 6,181,817 to Zabih et al. ("Zabih"), U.S. Patent No. 5,016,173 to Kenet et al. ("Kenet"), and U.S. Patent No. 6,188,777 to Darnell et al. ("Darnell"). These rejections are respectfully traversed.

Embodiments of the present invention are directed to an automated calibration system to track a selected object through a series of frames of data. A display device displays at least one image frame received from an image input device. The image frame includes a calibration rectangle. An image selection device utilizes the calibration rectangle to select the selected object in the at least one image frame to track. An image source device provides a hue saturation value (HSV) data array of pixels forming the at least one image frame. A processing device determines analysis data for pixels within the calibration rectangle based on the HSV data array, and determines test analysis data for a set of adjacent test windows. Each of the adjacent test windows has the same shape and the same pixel size as the calibration rectangle. Tracking data, to track the selected object, is selected from one of the calibration rectangle and the adjacent test windows having a lowest sum of a hue standard deviation and a

saturation standard deviation.

In the October 7, 2003 Office Action, the Examiner rejected claims 1, 3-11, 13-18, and 21, 24, 27, and 28 under 35 U.S.C. §103(a) as being obvious in view of a combination of Bradski, Zabih, Kenet, and Darrell. The Examiner stated that Bradski discloses an automated calibration system to track a selected object through a series of frames of data, and includes (a) a display device to display at least one image frame, where the image frame includes a calibration window; (b) an image selection device to select, via the calibration window, the selected object in the image frame; (c) an image source device to provide a hue saturation value (HSV) data array of pixels in the at least one image frame; and (d) an analysis module to determine analysis data for pixels within the calibration window, based on the HSV data array, and determine test analysis data for a set of adjacent test windows having a same shape as the calibration window.

The Examiner noted that Bradski is "silent on the claim limitation of 'lowest sum of a hue standard deviation and a saturation standard deviation.'" However, the Examiner stated that Darrell in view of Zabih and Kenet teaches selecting an object based on the lowest sum of a hue standard deviation and a saturation standard deviation. The Examiner referred to Darrell at col. 10, lines 44-65; Zabih at col. 2, lines 20-37; and Kenet at col. 20, lines 10-30 and col. 16, lines 1-20. The Examiner further stated that it would have been obvious to a person of ordinary skill in the art at the time of the invention to combine the teachings of Bradski, Darrell, Zabih, and Kenet in the direction of the claims.

Independent claim 1, as amended, recites (with emphasis added):

> 1. An automated calibration system to track a selected object through a series of frames of data, comprising:
> a display device to display at least one image frame received from an

image input device, wherein the image frame includes a calibration rectangle;

an image selection device to select, via the calibration rectangle, the selected object in the at least one image frame;

an image source device to provide a hue saturation value (HSV) data array of pixels forming the at least one image frame; and

a processing device to determine analysis data for pixels within the calibration rectangle, based on the HSV data array, and determine test analysis data for a set of adjacent test windows, ***each of the adjacent test windows having a same shape and a same pixel size as the calibration rectangle,*** *wherein tracking data, to track the selected object, is selected from one of the calibration rectangle and the adjacent test windows having a lowest sum of a hue standard deviation and a saturation standard deviation, and each of the adjacent test windows share at least one pixel with the calibration rectangle.*

Bradski teaches a method of tracking gestures. A user 110 sits in front of a video camera 120, and a computer system 157 digitizes the "talking head" image of the user 110. [Col. 3, line 61 – col. 4, line 10.] Each pixel of the video image is converted to or captured in a hue (H), saturation (S), and value (V) colorspace. Certain hue values in a sample region of the video image are accumulated into a flesh hue histogram. Hue values are only accumulated if their corresponding saturation (S) and value (V) values are above respective saturation (S) and value (V) thresholds. [Col. 4, lines 20-22.] After sampling all pixels in the sample area, a flesh hue histogram is normalized to create a flesh hue probability histogram. Once the flesh hue probability histogram has been created, video images are quickly converted into flesh hue probability distributions, and can be used to locate the center of an object and track the object. [Col. 4, lines 46-49 and 60-62.]

However, Bradski does not disclose, teach, or suggest an automated calibration system to track a selected object through a series of frames of data, including (a) a display device to display at least one image frame received from an image input device, wherein the image frame includes a calibration rectangle; (b) an image selection device to select, via the calibration rectangle, the selected object in the at least one image

frame; (c) an image source device to provide a hue saturation value (HSV) data array of pixels forming the at least one image frame; and (d) a processing device to determine analysis data for pixels within the calibration rectangle, based on the HSV data array, and *determine test analysis data for a set of adjacent test windows, each of the adjacent test windows having a same shape and a same pixel size as the calibration rectangle*, where tracking data, to track the selected object, is selected from one of the calibration rectangle and the adjacent test windows having a lowest sum of a hue standard deviation and a saturation standard deviation, and each of the adjacent test windows share at least one pixel with the calibration rectangle.

Bradski does not teach use of such adjacent test windows having a same shape and a same pixel size as the calibration rectangle. In the October 7, 2003 Office Action, the Examiner referred to FIGS. 10A and 10B and stated that Bradski discloses a calibration rectangle which is "the entire video frame or a calculation window in a form of a rectangle or a search window". Applicants believe that the Examiner means that the calibration rectangle is either video frame 1010, the calibration region 1030, or the search window 1020. Even assuming that Bradski does disclose such a calibration rectangle in FIGS. 10A and 10B, Bradski does not disclose, teach, or suggest use of *adjacent test windows, each having a same shape and a same pixel size as the calibration window*, where tracking data, to track the selected object, is selected from one of the calibration rectangle and the adjacent test windows having a lowest sum of a hue standard deviation and a saturation standard deviation, and each of the adjacent test windows share at least one pixel with the calibration rectangle.

The Examiner stated that Bradski discloses adjacent test windows in FIGS. 14A.

The Examiner stated that the boxes shown in FIG. 14A are adjacent test windows. Applicants respectfully disagree with the Examiner. FIG. 14A illustrates images representing scenes of a video. Boxes 1402, 1404, and 1406 display images representing scenes of video. Boxes 1408, 1410, 1412, 1414, and 1416 display images corresponding to specific shots. Window 1420, the big window in the center of FIG. 14A, is used to display the playing of a sequence of video images.

In order to navigate the video images, i.e., play different scenes, shots, etc., the user makes one of the gestures shown in FIGS. 13A-13H. The video system 1100 then recognizes the user's gesture and makes the requested changeover to the next shot, scene, etc. Accordingly, the boxes shown in FIG. 14A merely display captured video images available for playback. However, they have *absolutely nothing to do with the calibration of a tracking system*. Therefore, applicants respectfully submit that such boxes are not adjacent test windows as recited in independent claim 1, as amended.

Moreover, applicants submit that even assuming arguendo that those boxes were adjacent test windows[1], they do not have both the same size and shape as a calibration rectangle.

Therefore, independent claim 1, as amended, distinguishes over Bradski. Darrell, Zabih, and Kenet, alone or in combination, do not make up for the deficiencies of Bradski. Darrell discloses a method and apparatus of using computer vision to track a user's face, through use of depth estimation, color segmentation, and pattern classification. Zabih discloses a method and apparatus for comparing data objects using joint histograms which distinguish the data objects from other objects. Kenet

1 Applicants do not mean to suggest or imply that the boxes shown in FIG. 14A are adjacent test windows. Applicants believe they are not. Applicants assume so solely for the sake of argument.

discloses a method and apparatus for monitoring visually accessible surfaces of a body by stimulation of anatomic surfaces with light, followed by the quantitative analysis of digital images of reflected or emitted light from the surface of interest.

However, none of Darrell, Zabih, and Kenet, alone or in combination with Bradski, disclose, teach, or suggest an automated calibration system to track a selected object through a series of frames of data, including (a) a display device to display at least one image frame received from an image input device, wherein the image frame includes a calibration rectangle; (b) an image selection device to select, via the calibration rectangle, the selected object in the at least one image frame; (c) an image source device to provide a hue saturation value (HSV) data array of pixels forming the at least one image frame; and (d) a processing device to determine analysis data for pixels within the calibration rectangle, based on the HSV data array, and *determine test analysis data for a set of adjacent test windows, each of the adjacent test windows having a same shape and a same pixel size as the calibration rectangle*, where tracking data, to track the selected object, is selected from one of the calibration rectangle and the adjacent test windows having a lowest sum of a hue standard deviation and a saturation standard deviation, and each of the adjacent test windows share at least one pixel with the calibration rectangle.

Claims 3-8, 21, and 24 all depend, directly or indirectly, from independent claim 1, as amended. Accordingly, claims 3-8, 21, and 24 also distinguish over Bradski for the same reasons as those set forth above with respect to independent claim 1, as amended. Independent claim 9, as amended, contains limitations similar to those of independent claim 1, and therefore also distinguishes over Bradski for reasons similar

to those set forth above with respect to independent claim 1, as amended. Claims 11, 13-18, 27, and 28 all depend, directly or indirectly, from independent claim 9, as amended, and therefore also distinguish over Bradski for the same reasons as those set forth above with respect to independent claim 9, as amended.

Accordingly, applicants respectfully submit that the rejection of claims 1, 3-11, and 13-18, and 21, 24, 27, and 28 under 35 U.S.C. §102(e) should be withdrawn.

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Applicants believe that the foregoing amendments place the application in condition for allowance, and a favorable action is respectfully requested. If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call either of the undersigned attorneys at the Los Angeles telephone number (213) 488-7100 to discuss the steps necessary for placing the application in condition for allowance should the Examiner believe that such a telephone conference would advance prosecution of the application.

Respectfully submitted,

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